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RECENT ADVANCES IN THE SEARCH FOR THE LIVING GIANT GECKO OF NEW ZEALAND

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INTRODUCTION

Hoplodactylus delcourti is the world's largest gekkonid lizard (Aaron M. Bauer and Anthony P. Russell, 1986a, *Hoplodactylus delcourti* n. sp. [Reptilia:Gekkonidae], the Largest Known Gecko, *New Zealand Journal of Zoology*, Vol. 13: 141–48; Anthony P. Russell and Aaron M. Bauer, 1986b, Le Gecko Géant *Hoplodactylus delcourti* et ses Relations avec le Gigantisme et l'Endemisme Insulaire chez les Gekkonidae, *Mesogée*, Vol. 46: 25–28). It is believed that the *kawekaweau* of Maori folklore is referrable to this taxon (Aaron M. Bauer and Anthony P. Russell, 1987, *Hoplodactylus delcourti* [Reptilia: Gekkonidae] and the Kawekaweau of Maori Folklore, *Journal of Ethnobiology*, Vol. 7: 83–91).

The survival of the species in New Zealand remains in question, although no hard evidence for its occurrence in this century has come to light. Anecdotal and folkloric sources suggest that the former range of this or similar species may have included much of the North Island of New Zealand. The authors (Bauer and Russell 1986a, above) have suggested that the remaining rugged and heavily forested regions of the far north of the North Island might yet harbor populations of these lizards.

During an August, 1988, visit to New Zealand, the authors made a short reconnaisance trip to Northland (Fig. 1) in order to examine likely habitats of *Hoplodactylus delcourti*, and to gather additional information to interpret its probable ecology. W. Gilbert Mair (1873, Note on Rurima Rocks, *Transactions of the New Zealand Institute*, Vol. 5: 151–53) stated that the *kawekaweau* was associated with large forest trees, such as the rata. Given the association of the next largest gecko species, *Rhacodactylus leachianus*, with such forest habitats in New Caledonia, we considered such forested habitats as suitable refugia for the *kawekaweau*, and decided to examine the kauri and rata forest of the Northland region. In particular, the vicinity of the Waoku Plateau had been mentioned as a 19th century locality for this or a similar species (P. Walsh, 1905, A Rare Saurian, *Transactions of the New Zealand Institute*, Vol. 37: 351–52).

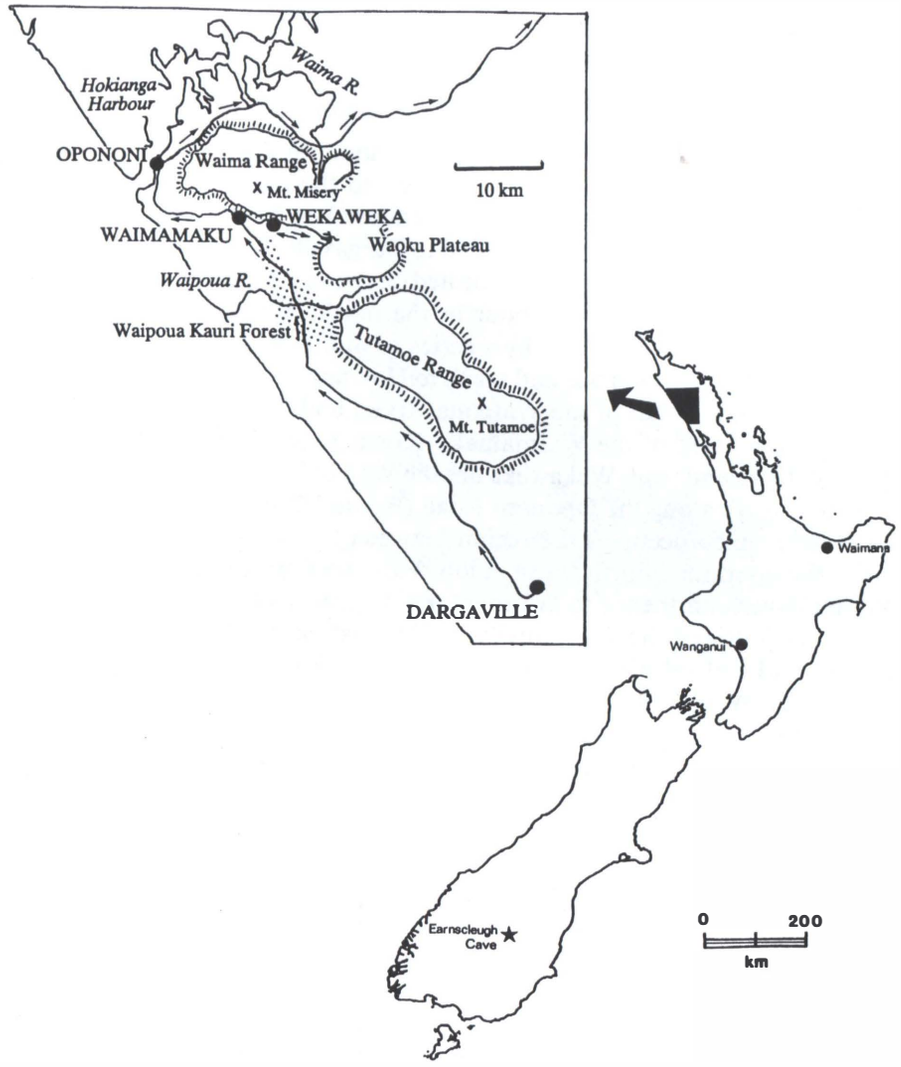

FIG. 1.—Map of west central Northland illustrating the route taken and localities mentioned in the text. The area of kauri forest indicated by the dotted pattern centered around the Waipoua River. Inset shows the region discussed (solid rectangle) in relation to other purported *kawekaweau* localities in New Zealand.

Our goal was to evaluate the area's suitability for supporting the giant gecko, and to assess the degree of disturbance in the region in order to gauge the likelihood of its persistence. No effort was made to actually locate and capture a specimen of the *kawekaweau* because 1) the terrain was difficult, and the most likely sites of occurrence were high in the forest canopy, and

2) minimal activity would be expected during the cool southern winter when the fieldwork was conducted.

Narrative Description

A total of three days was spent in Northland. On August 7, the authors and Grant Macredie, of Auckland, traveled to the region from Auckland. On August 8 and 9 a return trip was undertaken by the authors alone. Departing from Auckland we proceeded to Dargaville, located on the Wairoa River. All sites investigated were located between Dargaville in the south and Opononi at Hokianga Harbour in the north. The large forests of the region are bordered to the east by a series of mountains, from which rivers drain west to the Tasman Sea and north to Hokianga Harbour. The Tutamoe Range lies to the south of the Waipoua River, and the Waima Range (Fig. 2) lies to the north of the Waimamaku River. Between these small ranges and directly inland from Wekaweka lies the Waoku Plateau. From Dargaville we drove north along the Opononi Road (Route 12) to the Waipoua Forest Sanctuary, which occupies the region between the Waoku Plateau and the coast. We continued north through the Waipoua Forest kauri stands to the Wairau River and thence to Waimamaku, located on the river of the same name. We followed the Waimamaku Valley east on the Wekaweka Road to its end, and walked approximately 1 mile (1.6 km) up the Waoku Track towards the Waoku Plateau.

A heavy downpour made progress slow, and few observations could be made; consequently, we returned to Waimamaku and continued north to Opononi and Hokianga Harbor. En route, we made stops in the Waima Forest, near Mt. Misery, in the Waima Range. Our return to Auckland was via Waima, where we crossed the Waima River—site of the lizard observation reported by Walsh (1905, above)—Kaikohe, Kawakawa, and Whangarei. The second trip retraced the first as far as the northern edge of the Waipoua Forest Sanctuary, and observations were concentrated within the sanctuary itself.

The Waipoua Forest Sanctuary occupies 22,500 acres (9,105 ha) in the eastern part of the Waipoua Forest, approximately 30 miles (50 km) north of Dargaville. The area ranges from 600 to 1,987 feet (182 to 606 m) in elevation, and is hilly throughout. Many small streams cross the area, and are drained by the Waipoua and Wairau Rivers, both of which flow westward into the Tasman Sea. The sanctuary contains approximately 6,424 acres (2,600 ha) of kauri (*Agathis australis*), the largest existing stand in New Zealand. Kauris are by far the largest trees in the forest, reaching heights of over 164 feet (50 m) and girths of over 50 feet (15 m) (Fig. 3). The kauris are found in a mosaic of other trees, including rata (*Metrosideros robusta*), taraire (*Beilschmieda tarairi*), towai (*Weinmannia silvicola*), totara (*Podocarpus totara*), rimu (*Dacrydium cupressinum*), kahikatea (*Podocarpus dacrydioids*), and rewarewa (*Knightia excelsa*). The forest is also characterized by the presence of tree ferns, palms, climbers, epiphytes, and mosses (Fig. 4). Similar forests were examined during our visit to the the Waima Forest to the north. The area generally receives more than 71 inches (1,800 mm) of rain per year (W. R. McGregor, 1948, *The Waipoua Kauri Forest of Northern New Zealand,* privately published, Auckland), and mean annual temperatures are mild, ranging from 13° to 16°C (John Ogden and Moinuddin Ahmed, 1989, Climate Response Function Analyses of Kauri [*Agathis australis*] Tree-Ring Chronologies in Northern New Zealand, *Journal of the Royal Society of New Zealand,* Vol. 19: 205–21).

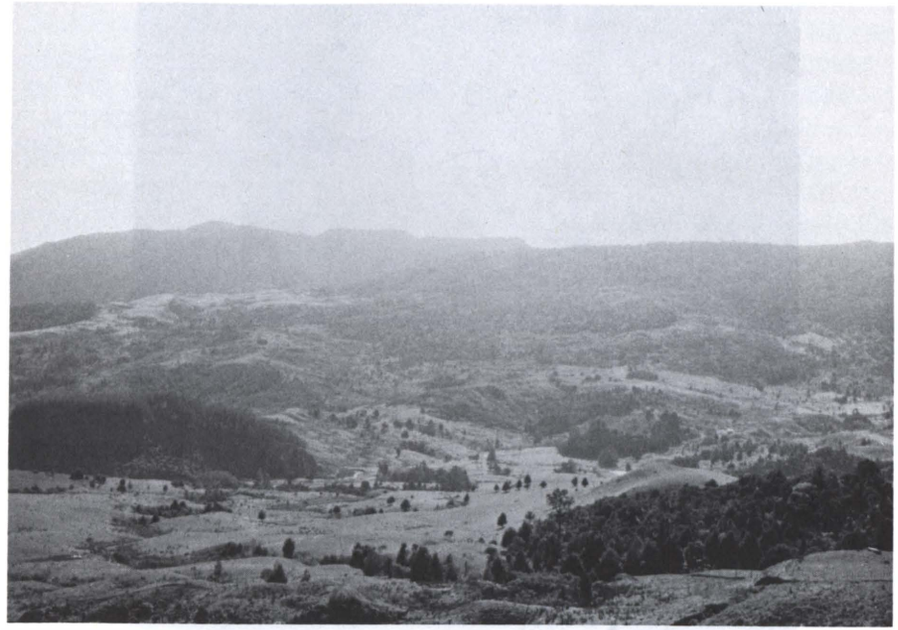

FIG. 2.—View through lowland agricultural land to the western slopes of the Waima Range.

The largest kauri trees have huge columnar trunks—girths of 50 feet (15 m) or more at 15 feet (4.6 m) height—which do not branch below 39 feet (12 m). The spread of the canopy of the largest tree, the "Tanemahuta" is about 11,600 square feet (1,078 sq. m) (Anonymous, 1987, *Waipoua Forest Sanctuary Northland Conservation Park,* Department of Conservation, Auckland).

Results

Mature kauri trees in Northland are several hundred years old (Ogden and Ahmed, 1989, above), and their persistence is evidence of minimal disturbance of the area. The Waipoua Forest has been under government

FIG. 3.—Base of a large kauri tree "Te Matua Ngahere," 53 feet, 10 inches (16.4 m) in girth. Anthony P. Russell (left) and Grant Macredie flank the tree.

control since 1876, and has had the status of a sanctuary since 1952. Prior to 1926, the forest was not accessible by road. Although logging and kauri gum collection occurred in some regions of the forest, much of the region we visited experienced little or no impact from these human activities. This region, thus, appears to be a prime potential refuge for *Hoplodactylus delcourti*. The canopy of the kauri forest constitutes an immense, three dimensionally complex and almost completely inaccessible habitat. Typically, it is such habitats that are the least well studied and understood. Elsewhere in the world, canopy dwelling lizards are only now being discovered and described in detail. While there is no direct evidence to link the *kawekaweau* to the canopy, the connection is plausible, and the canopy is perhaps the most likely zone for locating living specimens. The mountains surrounding the forest, especially the Waoku Plateau, remain sparsely populated and poorly accessible, perhaps providing some hope of the lizard's survival, and some explanation for its successful avoidance of detection.

FIG. 4.—Dense vegetation in the moist understory of the Waipoua kauri forest.

Whether extinct or merely rare and cryptic, the causes for the apparent decline of the *kawekaweau* in European times remain unclear. The authors have previously suggested that the introduction of rats may have negatively influenced populations, as it has in other reptile species (Anthony H. Whit-

aker, 1978, The Effects of Rodents on Reptiles and Amphibians. *In* R. R. Dingwall, J. A. E. Atkinson, and C. Hacy [eds.], *The Ecology and Control of Rodents in New Zealand Nature Reserves,* Department of Lands and Survey, Information Series No. 4, Wellington). However, the size of the *kawekaweau,* and its suggested microhabitat in the kauri or rata canopies, might have afforded some degree of protection from these mammals. Another possibility is that there may have been a natural reduction of suitable habitat. Although authors differ in their interpretations of the optimal growing conditions for kauri, there is evidence of a decline in populations in Northland in the last 2–3,000 years, prior to the arrival of humans and introduced predators in New Zealand (J. R. Dodson, N. J. Enright and R. F. McLean, 1988, A Late Quaternary Vegetation History for Far Northern New Zealand, *Journal of Biogeography,* Vol. 15: 647–56).

Future Plans

Recent interest in the *kawekaweau* has been fostered by the 1990 display of the holotype specimen—the only specimen known to exist—as part of a larger exhibition ("Forgotten Fauna—New Zealand's Amphibians and Reptiles") at the National Museum of New Zealand in Wellington. This display has prompted a number of informants to relate their observations of animals purported to be the *kawekaweau.* During the period February to April, 1990, several sightings were reported in the daily press in New Zealand, raising further the profile of the search for this animal. Many of the recent observations seem to be centered around Gisborne, far to the south of Northland (A. H. Whitaker and B. W. Thomas, 1990, *Large Lizard Sightings in the Gisborne Region: Report on a National Museum Investigation, 7–11 April 1990,* National Museum of New Zealand, Wellington). However, eyewitnesses from the area of the Waipoua Forest and Waoku Plateau have also been located (Grant Macredie, personal communication). The many sightings reported have prompted local herpetologists to investigate and follow up on sightings. While most of these have been dismissed for one reason or another, several appear not to be explainable on the basis of known animals (A. H. Whitaker and B. W. Thomas, 1990, above).

Subfossil remains perhaps referable to *Hoplodactylus delcourti* (Aaron M. Bauer and Anthony P. Russell, 1988, Osteological Evidence for the Prior Occurrence of a Giant Gecko in Otago, New Zealand, *Cryptozoology,* Vol. 7: 22–37) were found at Earnscleugh Cave, in Otago, South Island (Fig. 1). The original bones were not seen by us, but photographs kindly provided by Anthony H. Whitaker, acting herpetologist at the National Museum of New Zealand, who located the original specimens, are consistent with the interpretation that they belong to a very large gecko.

The renewed interest in the *kawekaweau* and the tangible evidence of a large gecko in the South Island of New Zealand lead us to believe that additional evidence of *Hoplodactylus delcourti* may be found in Northland. The habitat investigated in the Waipoua and Waima forests does appear suitable to support a large gecko species. Although we remain skeptical that the species is extant, we feel that every effort should be made to remain vigilant for its possible survival in the areas identified by historical and folkloric sources.

Our future plans include a thorough survey of sightings throughout New Zealand, with emphasis on the Northland District. In particular, we hope to concentrate on the testimony of local Maori residents. Information from native peoples have been shown to be reliable in determining certain aspects of vertebrate distribution, especially in cases where the animals in question were important to the mythology or tradition of the people (Andrew A. Burbidge, Ken A. Johnson, Phillip J. Fuller and R. I. Southgate, 1988, Aboriginal Knowledge of the Mammals of the Central Deserts of Australia, *Australian Wildlife Research,* Vol. 15: 9–39). We also advocate the organization of teams of observers to spotlight in the kauri and rata canopies at night to look for signs of *kawekaweau* activity.

We thank Grant Macredie for suggesting specific sites to us, and for accompanying us on one of the reconnaissance trips. Anthony Whitaker kindly provided us with photographs of the gecko bones described by Hutton, as well as with copies of recent newspaper accounts pertinent to the giant gecko. Lawrence Auerbach furnished additional reference material.